

IN THE CLAIMS:

This amendment is made in the 25 February 2003 Revised Format:

1 1. (Currently Amended) A thermal barrier coating
2 comprising a layer of rare-earth element phosphate said layer having a
3 thickness greater than about 20 micrometers, a thermal conductivity less
4 than about 2 W/mK and disposed on an exterior surface of a substrate so as
5 to thermally protect the substrate.

1 2. (Original Claim) The thermal barrier coating according
2 to Claim 1 further comprising a monazite or xenotime crystal structure.

1 3. (Original Claim) The thermal barrier coating according
2 to Claim 1, wherein the ratio between rare-earth element and phosphate is
3 about 1:1.

1 4. (Currently Amended) The thermal barrier coating
2 according to Claim 1, wherein the layer has having a thickness between 10
3 about 20 and 500 micrometers.

1 5. (Original Claim) The thermal barrier coating according
2 to Claim 1 deposited on a substrate having a temperature between 600°C
3 and 1100°C.

1 6. (Original Claim) The thermal barrier coating according
2 to Claim 5 deposited on a substrate having a temperature between 750°C
3 and 950°C.

1 7. (Original Claim) The thermal barrier coating according
2 to Claim 1 formed by a process selected from the group consisting of
3 chemical vapor deposition, physical vapor deposition, electron beam
4 evaporation, pulsed electron beam evaporation, laser ablation, and plasma
5 spraying.

1 8. (Original Claim) The thermal barrier coating according
2 to Claim 7 using single or multiple sources of materials selected from the
3 group consisting of rare-earth phosphates and mixtures of rare-earth
4 precursors with phosphorous precursors.

1 9. (Original Claim) The thermal barrier coating according
2 to Claim 1 formed with a columnar microstructure.

1 10. (Original Claim) The thermal barrier coating according
2 to Claim 1 formed with a porous microstructure.

1 11. (Original Claim) The thermal barrier coating according
2 to Claim 1, wherein the phosphate is lanthanum phosphate.

1 12. (Original Claim) The thermal barrier coating according
2 to Claim 1 deposited on one of a ceramic substrate and a metallic substrate.

1 13. (Currently Amended) The thermal barrier coating
2 according to Claim 12, wherein the metal metallic substrate is a nickel-based
3 superalloy, an iron-based superalloy or a cobalt-based superalloy.

1 14. (Currently Amended) The thermal barrier coating
2 according to Claim 13 further comprising a layer of aluminum phosphate
3 disposed between the layer of rare-earth element phosphate and the metal
4 metallic substrate.

1 15. (Original Claim) The thermal barrier coating according
2 to Claim 13 further comprising a layer of alumina between the metallic
3 substrate and said rare-earth element phosphate.

1 16. (Original Claim) The thermal barrier coating according
2 to Claim 15 further comprising a region of rare-earth aluminate between the
3 alumina and said rare-earth element phosphate.

1 17. (Original Claim) The thermal barrier coating according
2 to Claim 1 comprising a mixture of lanthanum phosphate, cerium phosphate
3 and neodymium phosphate.

1 18. (Currently Amended) A thermal barrier coating
2 comprising a layer of lanthanum phosphate said layer having a thickness
3 greater than about 20 micrometer and disposed on an exterior surface of a
4 substrate so as to thermally protect the substrate.

1 19. (Original Claim) The thermal barrier coating according
2 to Claim 18 further comprising a monazite crystal structure.

1 20. (Original Claim) The thermal barrier coating according
2 to Claim 18, wherein the ratio between lanthanum and phosphate is about
3 1:1.

1 21. (Currently Amended) The thermal barrier coating
2 according to Claim 18, wherein the layer has having a thickness between 10
3 about 20 and 500 micrometers.

1 22. (Original Claim) The thermal barrier coating according
2 to Claim 18 deposited on a substrate having a temperature between 600°C
3 and 1100°C.

1 23. (Original Claim) The thermal barrier coating according
2 to Claim 22 deposited on a substrate having a temperature between 750°C
3 and 950°C.

1 24. (Original Claim) The thermal barrier coating according
2 to Claim 18 formed by a process selected from the group consisting of
3 chemical vapor deposition, physical vapor deposition, electron beam
4 evaporation, pulsed electron beam evaporation, laser ablation, and plasma
5 spraying.

6 25. (Original Claim) The thermal barrier coating according
7 to Claim 24 using single or multiple sources of materials selected from the
8 group consisting of rare-earth phosphates and mixtures of rare-earth
9 precursors with phosphorous precursors.

1 26. (Original Claim) The thermal barrier coating according
2 to Claim 18 formed with a columnar microstructure.

1 27. (Original Claim) The thermal barrier coating according
2 to Claim 18 formed with a porous microstructure.

1 28. (Original Claim) The thermal barrier coating according
2 to Claim 18 deposited on one of a ceramic substrate and a metallic
3 substrate.

1 29. (Currently Amended) The thermal barrier coating
2 according to Claim 28, wherein the ~~metal~~ metallic substrate is a nickel-based
3 superalloy, an iron-based superalloy or a cobalt-based superalloy.

1 30. (Currently Amended) The thermal barrier coating
2 according to Claim 29 further comprising a layer of aluminum phosphate
3 disposed between the layer of lanthanum phosphate and the ~~metal~~ metallic
4 substrate.

1 31. (Original Claim) The thermal barrier coating according
2 to Claim 29 further comprising a layer of alumina between the metallic
3 substrate and the lanthanum phosphate.

1 32. (Original Claim) The thermal barrier coating according
2 to Claim 31 further comprising a region of lanthanum aluminate between the
3 alumina and the lanthanum phosphate.

1 33. (Original Claim) The thermal barrier coating according
2 to Claim 18 comprising a mixture of lanthanum phosphate, cerium
3 phosphate and neodymium phosphate.

1 34. (Currently Amended) A thermal barrier coating
2 comprising a layer of a mixture of rare-earth element phosphates and
3 refractory oxides said layer having a thickness greater than about 20
4 micrometers, a thermal conductivity less than about 2 W/mK and disposed
5 on an exterior surface of a substrate so as to thermally protect the
6 substrate.

1 35. (Currently Amended) The thermal barrier coating
2 according to Claim 34, wherein the layer has having a thickness between 10
3 about 20 and 500 micrometers.

1 36. (Original Claim) The thermal barrier coating according
2 to Claim 34 deposited on a substrate having a temperature between 600°C
3 and 1100°C.

1 37. (Original Claim) The thermal barrier coating according
2 to Claim 34 formed by a process selected from the group consisting of
3 chemical vapor deposition, physical vapor deposition, electron beam
4 evaporation, pulsed electron beam evaporation, laser ablation, and plasma
5 spraying.

6 38. (Original Claim) The thermal barrier coating according
7 to Claim 34 formed with a columnar microstructure.

1 39. (Original Claim) The thermal barrier coating according
2 to Claim 34 formed with a porous microstructure.

1 40. (Original Claim) The thermal barrier coating according
2 to Claim 34 deposited on one of a ceramic substrate and a metallic
3 substrate.

1 41. (Currently Amended) The thermal barrier coating
2 according to Claim 40, wherein the ~~metal~~ metallic substrate is a nickel-based
3 superalloy, an iron-based superalloy or a cobalt-based superalloy.

1 42. (Currently Amended) The thermal barrier coating
2 according to Claim 41 further comprising a layer of aluminum phosphate
3 disposed between the mixture and the ~~metal~~ metallic substrate.

1 43. (Original Claim) The thermal barrier coating according
2 to Claim 41 further comprising a layer of alumina between the metallic
3 substrate and the mixture.